

What is claimed is:

1. A method for connecting display panel substrates comprising the steps of:

(1) aligning the positions of and holding a first  
5 substrate and a second substrate whereon sealant material is disposed so as to form a waste region in the inner side region of the edges of the first and second substrates;

(2) inserting a spacer in said waste region between said first and second substrates;

10 (3) setting said cell gap by pressing said first and second substrates;

(4) hardening said sealant material; and

(5) withdrawing said spacer.

2. The method for connecting display panel substrates  
15 according to claim 1, wherein, if said connection is performed inside an air-tight processing chamber, a further step of evacuating said processing chamber from normal pressure to vacuum pressure is included between said step (1) and said step (2).

20 3. The connecting method for display panel substrates according to claim 2, further comprising, between said step (2) and said step (3), a step of returning said processing chamber in a vacuum state to normal pressure whilst maintaining a pressure difference of substantially zero  
25 between the expected cell interior space of said processing

chamber and the space outside said expected cell interior space.

4. The method for connecting display panel substrates according to claim 1, wherein, during said step (1) to said  
5 step (4), the first and second substrates are respectively fayed with and held on first and second surface tables, whilst drawing a vacuum between the outer faces of said first and second substrate on the other sides thereof to the mutually opposing inner faces of said substrates, and contact  
10 surfaces of said first and second surface tables which respectively confront these outer sides of the substrates.

5. The method for connecting display panel substrates according to claim 4, wherein, if said connection is performed inside a processing chamber, the air suction power  
15 for evacuating said processing chamber as a whole is less than the air suction power for faying said first and second substrates.

6. The method for connecting display panel substrates according to claim 1, wherein, if said spacer is constituted  
20 by a plurality of spacer elements numbering three or more, which are layered together in a mutually separable fashion, then the cell gap determined in said step (3) is adjusted by the total thickness of this plurality of spacer elements; and

said step (5) is performed by first removing a spacer  
25 element located in substantially the middle region whilst leaving the spacer elements contacting and holding said first

and second substrates, and then subsequently withdrawing the remaining spacer elements.

7. The method for connecting display panel substrates according to claim 1, wherein said spacer is constituted by a tapered block-shaped spacer element whose thickness varies at a constant rate, the cell gap determined in said step (3) being adjusted by withdrawing said spacer from an inserted state.

8. The method for connecting display panel substrates according to claim 1, wherein an additional auxiliary spacer element is appended to said spacer and the total thickness of the spacer and the auxiliary spacer element is set to a greater value than the prescribed cell gap;

in said step (2), the spacer with said auxiliary spacer element is inserted in between the first and second substrates; and

after said step (2) and before said step (3), fine adjustment is performed to achieve the prescribed cell gap by withdrawing said auxiliary spacer element.

9. The method for connecting display panel substrates according to claim 2, wherein an additional auxiliary spacer element is appended to said spacer and the total thickness of the spacer and the auxiliary spacer element is set to a greater value than the prescribed cell gap;

the first and second substrates are respectively fayed with and held on first and second surface tables, whilst drawing a vacuum between the outer faces of said first and

second substrate on the other sides thereof to the mutually opposing inner faces of said substrates, and contact surfaces of said first and second surface tables which respectively confront these outer sides of the substrates;

5        said step of evacuating said processing chamber from normal pressure to a vacuum is performed; and

10        in said step (2), said spacer with said auxiliary spacer element is inserted between the first and second substrates, and said auxiliary spacer element is caused to contact said first substrate.

10.    The method for connecting display panel substrates according to claim 1, wherein the hardening of said sealant material is performed by irradiation of ultraviolet light.

15        11.    The method for connecting display panel substrates according to claim 1, wherein the hardening of said sealant material is performed by heating.

20        12.    A connecting device for display panel substrates provided with a first surface table and second surface table for respectively holding first and second substrates, comprising:

        a spacer having a thickness substantially equal to a prescribed cell gap;

25        operating means for operating said spacer so as to insert said spacer in between said substrates, or withdraw said spacer from same; and

        hardening means for hardening the sealant material.

13. The connecting device for display panel substrates according to claim 12, further comprising substrate holding means for causing the first and second substrates to be respectively fayed with and held on said first and second surface tables, whilst drawing a vacuum between the outer faces of said first and second substrate on the other sides thereof to the mutually opposing inner faces of said substrates, and contact surfaces of said first and second surface tables which respectively confront these outer sides of the substrates.

14. A connecting device for display panel substrates according to claim 12, comprising:

processing chamber defining means for defining a processing chamber for connecting; and

pressure adjusting means for changing the pressure of said processing chamber freely from normal pressure to vacuum pressure or from vacuum pressure to normal pressure;

said processing chamber defining means being constituted principally by the first and second surface tables.

15. The connecting device for display panel substrates according to claim 12, wherein said spacer is constituted by a plurality of spacer elements numbering three or more, the respective spacer elements of said spacer being operated in mutually independent fashion, whereby the total thickness of said spacer can be adjusted.

16. The connecting device for display panel substrates according to claim 12, wherein said spacer is constituted by three spacer elements.

17. The connecting device for display panel substrates according to claim 12, wherein when said spacer is constituted by a single spacer element, said spacer has a shape whereby said cell gap can be altered.

18. The connecting device for display panel substrates according to claim 17, wherein the end of said spacer that is inserted in between the substrates has a wedge shape which decreases in thickness towards the tip thereof.

19. The connecting device for display panel substrates according to claim 12, wherein said spacer comprises a rotating head section composed so as to have a smooth elliptical vertical section; said rotating head section having a shape whereby the cell gap can be controlled by means of the rotating head section contacting the first and second substrates by being rotating within the interval of the waste region.

20. The connecting device for display panel substrates according to claim 12, wherein either one or both of said first surface table and second surface table is a quartz table, and said hardening means is an ultraviolet light irradiating apparatus.

21. The connecting device for display panel substrates according to claim 12, wherein said first surface table and second surface table are heating tables made from metal.